

Schedule

Week 1 (09/07-9/11)

- Day 1
 - Introduction to Theory of Computation¹
 - Introduction to OCAML²
 - Assignment 1³
- Day 2
 - OCAML basics⁴
- Day 3
 - OCAML basics (cont)⁵
- Day 4
 - OCAML basics (cont)⁶
 - OCAML example: sets as lists (optional)⁷

Week 2 (09/14-09/18)

- Day 1
 - Alphabets, strings, substrings, empty string, lexicographic ordering⁸
 - Alphabet and friends in OCAML⁹
 - Assignment 2¹⁰
- Day 2
 - Languages, examples, constructions¹¹
- Day 3
 - Languages, examples, constructions¹²
- Day 4
 - Deterministic Finite Automata¹³

¹[notes/theory_intro.html](#)

²[notes/ocaml_intro.html](#)

³[assignments/1.html](#)

⁴[notes/ocaml_basics.html](#)

⁵[notes/ocaml_basics.html](#)

⁶[notes/ocaml_basics.html](#)

⁷[notes/ocaml_sets.html](#)

⁸[notes/alphabet.html](#)

⁹[notes/ocaml_alphabet.html](#)

¹⁰[assignments/2.html](#)

¹¹[notes/languages.html](#)

¹²[notes/languages.html](#)

¹³[notes/fin_aut_dfa.html](#)

Week 3 (09/21-09/25)

- Day 1
 - Deterministic Finite Automata (cont)¹⁴
- Day 2
 - DFAs in OCAML¹⁵
- Day 3
 - Regular Languages¹⁶
 - Union of regular languages is regular¹⁷
- Day 4
 - Implementation of union in OCAML¹⁸
 - Assignment 3¹⁹

Week 4 (09/28-10/02)

- Day 1
 - Non-deterministic automata, examples²⁰
 - Implementation in OCAML
 - DFA equivalent to an NFA
- Day 2
 - Regular Expressions²¹
 - RegEx -> NFA
- Day 3
 - Nonregular languages and the Pumping Lemma²²
 - Assignment 4²³
 - Catching up
- Day 4
 - Lexers²⁴
 - Midterm 1

¹⁴[notes/fin_aut_dfa.html](#)

¹⁵[notes/ocaml_dfa.html](#)

¹⁶[notes/fin_aut_dfa.html](#)

¹⁷[notes/fin_aut_dfa.html](#)

¹⁸[notes/ocaml_dfa.html](#)

¹⁹[assignments/3.html](#)

²⁰[notes/fin_aut_nfas.html](#)

²¹[notes/regexp.html](#)

²²[notes/nonregular.html](#)

²³[assignments/4.html](#)

²⁴[notes/lexers.html](#)

Week 5 (10/05-10/09)

- Day 1
 - Context Free Grammars²⁵
 - Examples of derivations
- Day 2
 - Programming examples of CFGs
 - Ambiguous grammars
- Day 3
 - Chomsky Normal Forms
- Day 4
 - PushDown Automata definition

Week 6 (10/12-10/16)

- Day 1
 - PDAs more examples
 - OCAML implementation
- Day 2
 - CFG \rightarrow PDA
- Day 3
 - PDA \rightarrow CFG
- Day 4
 - Non-context-free grammars
 - Pumping lemma for CFGs

Week 7 (10/19-10/23)

- Day 1
 - Fall Break
- Day 2
 - Brief intro to parsers
- Day 3
 - More on parsers?
- Day 4
 - Turing Machines

²⁵notes/cfg.html

Week 8 (10/26-10/30)

- Day 1
 - Turing Recognizable vs Turing Decidable languages
- Day 2
 - Multitape / Nondeterministic Turing machines
- Day 3
 - The Church-Turing thesis, algorithms
- Day 4
 - Decidable Problems, for regular languages

Week 9 (11/02-11/06)

- Day 1
 - The Halting Problem
- Day 2
 - Undecidability of Halting Problem
- Day 3
 - Catching up
- Day 4
 - Midterm 2

Week 10 (11/09-11/13)

- Day 1
 - Reducibility
- Day 2
 - Regularity of languages is undecidable
- Day 3
 - Time Complexity classes
- Day 4
 - The class P

Week 11 (11/16-11/20)

- Day 1
 - The class NP
- Day 2
 - P vs NP, NP-complete problems
- Day 3
- Day 4

Week 12 (11/23-11/27)

- Day 1
- Day 2
 - Thanksgiving Break
- Day 3
 - Thanksgiving Break
- Day 4
 - Thanksgiving Break

Week 13 (12/01-12/04)

- Day 1
- Day 2
- Day 3
- Day 4

Week 14 (12/07-12/11)

- Day 1
- Day 2
- Day 3
- Day 4